

Claims

- [c1] 1. A chip structure, comprising:
- a chip having a first passivation layer and at least a bonding pad, wherein the bonding pad is exposed by the first passivation layer and the first passivation layer has at least a recess;
- a redistribution layer formed over the first passivation layer, wherein the redistribution layer electrically connects with the bonding pad and extends from the bonding pad to the recess;
- a second passivation layer formed over the first passivation layer and the redistribution layer, wherein the second passivation layer has an opening that exposes the redistribution layer above the recess; and
- at least a bump disposed inside the opening and electrically connected to the redistribution layer above the recess.
- [c2] 2. The chip structure of claim 1, wherein an obtuse angle is formed between a sidewall of the recess and a bottom surface of the recess.
- [c3] 3. The chip structure of claim 1, further comprising at least an under-bump-metallurgy layer between the re-

distribution layer that is exposed by the opening and the bump.

- [c4] 4. The chip structure of claim 3, wherein the under-bump-metallurgy layer further comprises:
 - a first metallic layer formed over the opening-exposed redistribution layer; and
 - a second metallic layer formed over the first metallic layer.
- [c5] 5. The chip structure of claim 4, wherein a material constituting the first metallic layer is selected from the group consisting of aluminum, titanium, titanium-tungsten alloy, tantalum, tantalum nitride and chromium.
- [c6] 6. The chip structure of claim 4, wherein a material constituting the second metallic layer comprises copper.
- [c7] 7. The chip structure of claim 4, wherein the under-bump-metallurgy layer further comprises at least an electroplated layer formed over the second metallic layer and the electroplated layer is selected from the group consisting of an electroplated copper layer, an electroplated nickel layer, an electroless nickel layer, an electroless plated gold layer and combination thereof.
- [c8] 8. The chip structure of claim 3, wherein the under-bump-metallurgy layer further comprises:

a first metallic layer formed over the opening-exposed redistribution layer;

a second metallic layer formed over the first metallic layer; and

a third metallic layer formed over the second metallic layer.

- [c9] 9. The chip structure of claim 8, wherein a material constituting the first metallic layer is selected from the group consisting of aluminum, titanium, titanium-tungsten alloy, tantalum, tantalum nitride and chromium.
- [c10] 10. The chip structure of claim 8, wherein a material constituting the second metallic layer is selected from the group consisting of nickel-vanadium alloy and copper-chromium alloy.
- [c11] 11. The chip structure of claim 8, wherein a material constituting the third metallic layer comprises copper.
- [c12] 12. The chip structure of claim 8, wherein the under-bump-metallurgy layer further comprises at least an electroplated layer formed over the third metallic layer and the electroplated layer is selected from the group consisting of an electroplated copper layer, an electroplated nickel layer, an electroplated gold layer and combination thereof.

- [c13] 13. The chip structure of claim 1, wherein the redistribution layer further comprises:
 - a first metallic layer formed over the first passivation layer; and
 - a second metallic layer formed over the first metallic layer.
- [c14] 14. The chip structure of claim 13, wherein a material constituting the first metallic layer is selected from the group consisting of aluminum, titanium, titanium-tungsten alloy, tantalum, tantalum nitride and chromium.
- [c15] 15. The chip structure of claim 13, wherein a material constituting the second metallic layer comprises copper.
- [c16] 16. The chip structure of claim 1, wherein the redistribution layer further comprises:
 - a first metallic layer formed over the first passivation layer;
 - a second metallic layer formed over the first metallic layer; and
 - a third metallic layer formed over the second metallic layer.
- [c17] 17. The chip structure of claim 16, wherein a material constituting the first metallic layer is selected from the group consisting of aluminum, titanium, titanium-tung-

sten alloy, tantalum, tantalum nitride and chromium.

- [c18] 18. The chip structure of claim 16, wherein a material constituting the second metallic layer is selected from the group consisting of nickel–vanadium alloy and copper–chromium alloy.
- [c19] 19. The chip structure of claim 16, wherein a material constituting the third metallic layer comprises copper.
- [c20] 20. The chip structure of claim 1, wherein an obtuse angle is formed between a sidewall of the opening and a bottom surface of the opening.